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A Syllogistic Approach to Attitude Change

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by

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Life

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Abstract

In a 2 x 2 x 2 factorial design 216 Ss' attitudes were measured with reference to a "U.S. - Russian Pooling of Resources" issue. 1/2 of the Ss then received a high credible source biography wherein the "author of the following message" was of excellent reputation and competence. The other half read a low credibility source biography. Each of these groups was then further divided such that 1/2 received a message presented in syllogistic form which argued for complete pooling of resources. The other half in each credibility condition received a similar message written, however, in ordinary discursive fashion. Half of the Ss in each of these four cells were further asked to write out the conclusions to the message they read while for the other 1/2 the conclusions were immediately provided. Following this Ss were again asked to respond to the attitude questionnaires.

Results, considering the pre- to posttest attitude change scores indicate that the syllogistic approach to attitude change is superior to the discursive approach providing that there are provisions made for reinforcement during the learning session. Differences in results as measured by a simple Graphic Rating Scale and the Semantic Differential Scale suggest that the two scales are sensitive to quite different attitudinal factors and that the Discursive Communication somehow affects a wide range of these factors. The Syllogistic Communication, on the other hand, manipulates what is probabily a more cognitive component of an attitude. Results are interpreted as providing reasonable support for a Reinforcement interpretation of

attitude change and as providing some negative evidence for a Consistency Theory interpretation.

Chapter I

Since Thurstone's (1929, 1931, Thurstone & Chave, 1929) early work on their measurement, perhaps the greatest impetus for the study of attitudes and attitude change was that provided by the Yale Communications Research Program and culminating in the Reinforcement Theory as most concisely set forth in Hovland, Janis, & Kelley's (1953) Communication and Persuasion. The work of this group, focussed as it was on some of the more relevant external variables involved in attitude change, has yielded a lasting empirical framework and methodology to a formerly barren study. Yet a meaningful theoretical integration of the empirical data generated by this early work was slow in coming, and it is only more recently that the social psychologist has seriously met this need.

The most prominant current response to a theoretical integration, that of Consistency Theory, while providing an exceedingly heuristic framework, must nevertheless in the last analysis be considered as descriptive as opposed to explanatory. Thus, whether under the guise of a tendency towards balance (Heider, 1946, 1958), a dissonance-reducing drive (Festinger, 1957; Brehm & Cohen, 1962), a need for congruity (Osgood, Suci, & Tannenbaum, 1953), or simply a reflection of the "homeostatic principle governing all of nature," this group of theorists posits some fundamental principle whereby the human psyche seeks to maintain a consistent set of orientations towards any given stimulus object and between any multiplicity of similar stimulus objects. And it is this tendency which allows of attitude change when any one of its sub-systems has changed. Little attempt is made by these theorists

to explain the process of attitude change with any more fundamental analysis than that of a consistency tendency or drive. Learning, attention, and acceptance factors (cf. Hovland, Janis, & Kelley, 1953) are largely ignored, as are personality and situational factors which might mitigate or enhance the conditions under which, and the degree to which, attitude change will occur. These questions are left to others whose interests run more along these lines. Thus, social psychology is bequeathed with a concept, the validity of which is doubtful, to be incorporated wherever it seems suitable or convenient.

Reinforcement Theory, providing the orientation for Hovland, et al. (1953), has traditionally classified an attitude as a learned response to a given set of stimuli (cues). Such learning, of course, is contingent upon factors of reinforcement which establish the bonds between the cues and opinion responses, the product of which is the attitudinal response. Although it is unclear as to the nature of the specific reinforcement, or to the motivational basis for such reinforcement, it has been proposed by Skinner (1953) that such reinforcement can be derived from the fact of "being right" or of having confirmed the expectations, anticipations and the like which follow from one's opinions. Such confirmation provides for secondary reinforcement, thus strengthening the cue-response habit known as attitude. Countercommunications establish competing responses (i.e., those opinions expressed by the communicator) to a similar set of cues (the same attitude object), and the bonds for these cue-response chains are reinforced through those factors which generate confirmation for the advocated

attitudinal position. Attitude change occurs when these new bonds exceed the strength of the originally-held cue-opinion bonds.

Since attitude change results through a superior summated or averaged (the function is not made clear) bond strength of all those counterattitudinal opinions which are responses to the same attitude object, it is the task of Reinforcement Theory to specify how it occurs that the attitude will change when the cue-opinion responses have changed. As Insko (1967) puts it, " . . . if it is asserted that opinion-mediated attitude change is a result of quasi-logical considerations, then to what extent is a strictly reinforcement interpretation being forsaken for a consistency point of view." It is the purpose of this paper to explore the learning process by which attitudes are changed, within a strictly Reinforcement orientation, by experimentally investigating two of those variables assumed to be crucial to the learning process, and by introducing a third variable which, while not necessarily related to learning per se, is somehow related to the acceptance of what has been learned.

Jones and Gerard (1967) present a paradigm for conceptualizing attitudes which, while not violating the fundamentals of Reinforcement Theory, does provide the departure for, but not an answer to, a possible escape from the Reinforcement + Consistency (cf. Insko, 1967) concession.

Hovland et al. (1953) imply that an attitude is something other than a system of cue-opinion bonds, yet enjoys only the strength and direction of those bonds. It may be said that cognitions give rise to opinions and these opinions are the base stuff of which attitudes are

formed. But an attitude is something different, else it would necessarily change with opinion change. Jones and Gerard, however, conceive of an attitude as nothing more than a conclusion to a set of beliefs and values. Thus, by definition, if any belief or value changes, so also must the attitude. Avoiding for the moment a bow to Consistency Theory, then, the task is to examine belief and value change from which attitude change necessarily must follow.

Following a Bruner, Goodnow, and Austin (1957) approach, given the total set of stimuli (cognitions) manifested by an object, a cognitive category is in the first instance tentatively defined as that which specifies which of those cues are relevant (i.e., define the object) and which are irrelevant. The category is, then, a system of cognitions, a cognitive system. However, cognitive categories do not exist in isolation from one another, but rather are, through experience (i.e., learning), found to be to a greater or lesser extent associated with one another. Jones and Gerard term this type of association a belief. Thus the phrase "Lemons are yellow" is simply the singling out of one of the relevant (i.e., defining) cues from the category "lemon," and expressing this. However, the phrase "Lemons go well with fish" is not necessarily the expression of a category as previously defined, since neither "lemon" nor "goes well with fish" defines the other. Rather, this is tje expression of a belief--the association of two categories when neither defines the other. Thus, the individual has found that, at least within the realm of his own experience, "lemon" and "goes well with fish" are often associated with one another, and thus he believes

that "lemons go well with fish."

In addition to cognitions (cues), categories and beliefs Jones and Gerard define the concept of value as an association between a category and an emotional feeling. Thus, while the expression "lemons go well with fish" would be the expression of a belief, "What goes well with fish is good" would be the expression of a value.

Now it was previously stated that an attitude is the conclusion drawn from a set of beliefs and values. More specifically, however, an attitude is formally defined by Jones and Gerard, as the conclusion drawn from a syllogism containing one belief premise and one value premise. Thus, given the belief: Lemons go well with fish

and the value: What goes well with fish is good

the conclusion: Lemons are good

must necessarily be drawn. This conclusion, then, is the attitude towards lemons for the individual accepting both the belief and the value premise.

Since an attitude is for Jones and Gerard nothing more than the conclusion to a belief (cognitive) and a value (affect) premise, if either changes so also must the attitude change. It needs to be emphasized, however, that <u>it is by virtue of definition alone</u> that this paradigm seems to be other than a rephrasing of Consistency Theory. Upon closer inspection,however, what is being said is that attitude change is not a consequence of any balance tendency, but rather, that the phenomenon of a balance tendency is simply a consequence of the nature of an attitude, but only as defined by Jones and Gerard. And just as a strictly

Reinforcement interpretation seems to have been forsaken for a Consistency point of view (cf. Insko, 1967), so also is the Jones and Gerard vulnerable to a comparable cricitism. For, again, it is solely by definition of an attitude as a syllogistic conclusion that the Jones-Gerard paradigm escapes classification as a Consistency Theory.

Furthermore it seems that this model is more appropriate from a post hoc than from a predictive point of view. Thus, given a person's attitude, it should be possible, on the basis of skillful interviewing techniques, to construct those syllogistic premises which lead to the conclusion. (attitude). And since an attitude need not simply be the conclusion to one syllogism, but may be the conclusion to a chain of interrelated syllogisms (i.e., the vertical structure) it should be theoretically possible to discover this entire vertical structure of an attitude. Likewise, on the assumption that a given attitude is the result of several or more chains of syllogisms, it should be possible to discover this horizontal structure as well.

To trace back from conclusions to premises is one thing. However, to proceed from premises to conclusions is a more difficult task, for there is no assurance that an individual will accept the premises.

Finally, Jones and Gerard assume that the correct conclusion will be accepted when drawn, an assumption which, in light of research in defensive processes, seems unwarranted. Thus, a refinement of the model is needed to explain the conditions under which premise and conclusion will be accepted, and furthermore, to specify the degree of this acceptance (i.e., the degree of attitude change that will take place).

Thus far, in summary, it has been indicated that while Consistency Theory attempts to provide a theoretical integration of attitude change research it largely ignores many of those factors which Reinforcement Theory has shown to be relevant to the attitude change process. Furthermore, it was noted that Consistency Theory merely posits an unproven assumption to explain the process and is, in the last analysis, descriptive as opposed to analytic. Yet Reinforcement Theory, itself, is subject to criticism since it has not made clear how it is that an attitude will change when the cue-opinion bonds have changed, and it is the purpose of this paper to explore this question more fully.

The Jones and Gerard paradigm procides the starting point for this investigation by providing a framework within which attitudes can be conceptualized. Yet it was noted that their approach rests solely on its narrow definition of an attitude and furthermore that its value lay more in a post hoc understanding than a predictive analysis. Thus, while retaining the Jones and Gerard paradigm for organizational purposes the theoretical orientation of this paper is on a Reinforcement interpretation of attitude change.

According to Hovland, Janis, and Kelley, attitude change is contingent upon three factors: a) attention to the counterattitudinal communication; b) comprehension of the position advocated; and c) acceptance of this position. The first two factors can easily be collapsed into a general learning factor and will be considered as such throughout this paper. Thus, attitude change is directly related to a) the learning of the communication, and b) the acceptance of this

communication.

According to Skinner, that factor which is most important for learning to occur is reinforcement contingent to the performance of a correct response. Thus, given that an individual has made a response to a given set of stimuli, if that response is acknowledged as "Correct" the result is reinforcement to the individual and an increased liklihood that that response will again be made to a similar set of stimuli on a subsequent occasion. A second factor which he says will maximize learning is the judicious arrangement of stimuli (cues) designed to elicit the desired learning response. Thus, through the careful arrangement of stimuli one is able to increase the probability of a correct response being elicited. The purpose of a stimulus program, then, is twofold: a) the maximization of the opportunity for reinforcement to the individual at each step in the learning process, in order to maximize the occurance of reinforcement during the learning process; and b) the minimization of the abruptness of these learning steps involved in progressing through the learning session (i.e., gradualness), in order to maximize the probability of eliciting the correct learning response.

The logical syllogism is, according to Skinner, a way of arranging stimuli such that there is a maximum liklihood of the desired response being elicited. Furthermore, the vertical structure of a series of related syllogisms can be regarded as nothing more than a program leading to the final (advocated attitudinal position) learning response, and thus, maximizes the probability of eliciting that desired learning response.

Secondly, the conclusion to each syllogism (learning step) in this learning program provides a logical opportunity for reinforcement during the learning session and provides as many opportunities for this reinforcement as there are syllogisms in the program. A syllogistic program, then, can be interpreted as an extremely efficient program leading to the learning of the desired counterattitudinal position.

A discursive argument can also be viewed as a program leading to the elicitation of the desired learning response. In the interests of "correct" literary format and of holding the interest of the reader, however, there is less emphasis on rigid adherence to the mechanics of formal logic. Thus, argument premises may be presented out of logical order or as "diluted" through the addition of irrelevant (from a logical point of view) terms and connecting phrases. Conclusions need not follow immediately after the presentation of premises and may, in fact, be stated several or more paragraphs later, thus losing their impact as necessary conclusions in the interests of literary appeal or dramatic impact.

Furthermore, because a discursive communication can be reduced only to the paragraph level without interrupting an integral train of thought there are only as many opportunities for the drawing of meaningful conclusions as there are well-constructed paragraphs. And even these opportunities may be somewhat arbitrary and random since an integral thought-pattern may be at other times considered as small as the sentence or even the word, or, as large as the communication itself. Yet to arbitrarily interject conclusion-drawing requirements in such a manner may only serve to confuse the reader or to lead him astray since the

premises necessary for correct conclusion-drawing may have occurred several sentences or paragraphs earlier, or may not even have been presented as yet. Thus, it is highly likely that a discursive program is neither so carefully constructed nor as efficient in providing for the administration of reinforcement as contingent upon conclusion-drawing during the learning session. It follows, then, that the syllogistic program will be superior to the discursive program in maximizing the learning of the counterattitudinal communication.

Since it is not only the judicious arrangement of stimuli (syllogistic versus discursive) that contributes to the learning of the correct response, but even more importantly, the amount of reinforcement provided during the learning session, it follows that if this reinforcement schedule is reduced so also will be the consequent learning. Since Skinner interprets the confirmation of the elicited response as "Correct" as the reinforcement for that response such reinforcement requires that the response be made before the reinforcement can occur. This is to say, then, that the individual must draw his own conclusion, before it is presented to him in the program, if the syllogistic program superiority as a function of reinforcement contingencies, is to obtain. Likewise, for such reinforcement to obtain in the discursive program the subject must also draw his conclusions before they are presented by the program. However, as has already been indicated, the opportunity for correct conclusion-drawing is greater with the syllogistic program, thus giving it its superiority over the discursive program. If Skinner is correct, then, when the opportunity for the individual to draw his own conclusions is

absent the superiority of the syllogistic over the discursive program will rest only on the more judicious arrangement of stimuli; thus the superiority will be greatly reduced.

Finally, once a counterattitudinal communication has been learned it is further necessary that this position be accepted in order for attitude change to actually obtain. Yet this acceptance is largely dependent upon two broadly defined classes of variables. The first of these is the intrinsic value of the communication itself. If the communication is sufficiently compelling, i.e., if the conclusions to the to the communication are seen as following necessarily from the arguments used and if these arguments have a certain face validity, then communication acceptance is likely to follow. If, however, the communication itself is substandard, or if the reader is not aware that the conclusions drawn are necessary conclusions because of a confusing (from a strictly logical point of view) communication, then it is likely that acceptance will rely on variables extrnsic to the communication, e.g., source considerations.

Now a syllogistic program has both a well-defined horizontal structjre (number of syllogistic chains in the program), and a well-defined tightly knit vertical structure (i.e., each syllogistic chain itself). Providing that the arguments have a certain face validity, then the conclusions following from those arguments are recognized as necessary, and thus acceptance is greatly facilitated. A discursive communication, on the other hand, has a

well-defined horizontal structure

(operationally defined as the number of different arguments used in the communication) but a poorly defined vertical structure. Each argument is usually not laid out in as tight a fashion as in a syllogistic chain. Thus conclusions are less likely to be seen as necessary and there will be a greater dependence on external variables such as source credibility for acceptance to occur.

On the basis of the preceeding discussion, then, the hypotheses of this study are:

1. A Syllogistic program provides for greater attitude change then does a Discursive program.
2. Conclusion-Drawing by subjects results in greater attitude change than if subjects are not asked to draw their own conclusions.
3. High Source Credibility results in greater attitude change than Low Source Credibility.
4. An interaction is predicted between Programs and Conclusion-Drawing such that the superiority of Syllogistic over Discursive programs is significantly diminished in those conditions where subjects are not asked to draw their own conclusions.
5. There is predicted a Program x Credibility interaction such that the Source Credibility manipulation has less influence on attitude change induced through the Syllogistic Program than it will have in the Discursive conditions.

Chapter II

Method

This experiment followed a 2 x 2 x 2 factorial design considering the variables:

a) Program: Syllogistic (S) versus Discursive (D)

b) Source Credibility: High (HC) versus Low (LC)

c) Conclusion-Drawing: Self-Drawn (SD) versus Other-Drawn (OD)

216 male and female Ss from the firth through third year college classes were tested during their regular summer school class periods. Each S was asked to indicate his attitude towards a "U.S. - Russian Pooling of Resources" issue by responding to two different attitude rating scales. The first of these was a one-item, 100-point Graphic Rating Scale (GRS) designed by McGuire (1960) on which Ss were asked to evaluate the probability of the truth of a statement which was strongly in favor of a complete pooling of resources and talents (Appendix I). As a secondary measure an abridged (18-item, 126-point) Semantic Differential Scale (SDS) was also used. All items on this scale were selected for their high h^2 (proportion of total factor variance accounted for) value, seven from the evaluative dimension, four from the potency dimension, and one each from the oriented activity, tautness, novelty, receptivity, and aggressiveness dimensions as originally conceived by Osgood, Suci, and Tannenbaum (1958), (Appendix II). The Graphic Rating Scale was selected because it is a general attitudinal measuring device designed to evaluate basic changes in attitudinal position as a function of

persuasion: The Semantic Differential Scale, on the other hand, was selected for its selectivity to those factors specifically related to affective change only.

Source Manipulation. Following this Ss read a short biography introducing either an extremely expert and trustworthy Ph.D. in the field of aerospace research (HC), (Appendix III), or an extremely shady teenager in a high school correctional institution (LC), (Appendix IV). These biographies also indicated that Ss would later read a communication written by the individual whose biography they had just read.

After reading the biography Ss were asked to indicate how expert and honest they considered the source to be as based on the information they had received in the biography. Each of these two dimensions was measured by subject-responses to an 11-point graphic scale ranging from "No Expertness" (or "Honesty") at position "0" through"Complete Expertness"(or "Honesty") at the 11th position (Appendix V).

Program Manipulation. One-half of the Ss in each Credibility condition were then presented with a series of 9 interrelated syllogisms of the type: A leads to B

B leads to C

A leads to C

B leads to C

C leads to C

B leads to D

C leads to D

D leads to E . . . etc., such that the final conclusion to each of the two syllogistic lines of argument (5 syllogisms for the first argument, 4 for the second) was that the United States and Russia should pool all of their resourses and talents in space exploration. For example:

The highest purpose in life for man is the full realization of his human potential

The full realization of his human potential lies in man's understanding of his role in the Universe

Therefore: the highest purpose in life for man lies in his understanding of his role in the Universe.

These syllogisms are presented in Appendices VI and VII.

For those Ss in the Discursive condition the two lines of argument as used in the Syllogistic communication were presented in an ordinary discursive fashion with correct sentence structure, syntax, etc., (Appendices VIII and IX). No attempt was made to keep the length of the two types of Programs equal although all major, minor and middle terms in the Syllogistic Communication were used an equal number of times in the Discursive Communication.

Conclusion-Drawing Manipulation. One-half of the Ss in each of these four Credibility x Program cells were asked to write out the conclusion to each of the syllogisms or discursive arguments based upon the argument premises. For these Self-Drawn treatments the premises were presented on one page up to the point where a conclusion could be drawn. At this

point space was provided and Ss were asked to write in the correct conclusion to those premises. Ss were then asked to turn to the following page upon which the correct conclusion was printed. The page following this contained another set of premises with space provided for writing in conclusions, and so on, until the entire message had been presented (Appendices VI and VIII). Because the Syllogistic condition requires considerab ly more writing since there were a total of 9 syllogisms used (i.e., 9 sets of premises from which conclusions could be drawn versus two for the Discursive treatments), those Ss in the Discursive cells were also asked to write a short summary of the major arguments in addition to the conclusions to control for total amount of writing required (Appendix VIII). Finally, for those Ss in the Other-Drawn cells the conclusions to the premises followed immediately from those premises. Ss were not asked to draw the conclusions first (Appendices VII and IX).

Following this Ss were asked to again respond to the two attitude rating scales. They were then told the general nature of the study and dismissed.

Chapter III

Results

Two different scales were used to measure attitudes towards the "U.S. - Russian Pooling of Resources" issue. The first and primary measure was a one-item, 100-point Graphic Rating Scale as used by McGuire (1960). As a secondary measure, an abridged 18-item Osgood Semantic Differential Scale was also used. Since each item on this scale is checked on a seven-point scale there is a 126-point maximum score. The dependent measure being considered in this study is the pre- to posttest change in scale ratings for each S. A 2 x 2 x 2 analysis of variance was performed considering each of the two scales separately.

Graphic Rating Scale. Table 1 presents the means and standard deviations of the pre- and posttest attitude ratings for each of the eight cells of this study.

Table 1

Graphic rating scale

Pre- and posttest means and standard deviations

				Pre	Post
Syllogistic	Self-Drawn	Hi-Cred	$\bar{X}$	74.30	85.15
			SD	23.09	18.88
		Lo-Cred	$\bar{X}$	72.30	82.70
			SD	22.26	16.95
	Author-Drawn	Hi-Cred	$\bar{X}$	66.67	71.78
			SD	29.09	28.32
		Lo-Cred	$\bar{X}$	59.70	61.85
			SD	26.41	26.88
Discursive	Self-Drawn	Hi-Cred	$\bar{X}$	60.63	70.52
			SD	29.72	26.61
		Lo-Cred	$\bar{X}$	79.04	80.63
			SD	22.66	22.22
	Author-Drawn	Hi-Cred	$\bar{X}$	67.33	71.11
			SD	27.95	29.06
		Lo-Cred	$\bar{X}$	69.11	71.89
			SD	18.24	17.84

A score of 0 represents an attitudinal position completely discrepant from that advocated by the experimental communication while a score of 100 represents a position in complete agreement with that of the message. Table 2 presents the attitude change scores for these same cells.

Table 2

Graphic rating scale

Means and standard deviations of the

Absolute Attitude Change Scores

for each of the eight treatment cells[a]

Syllogistic	Self-Drawn	Hi-Cred	$\bar{X}$	110.85
			SD	15.61
		Lo-Cred	$\bar{X}$	110.41
			SD	22.19
	Author-Drawn	Hi-Cred	$\bar{X}$	105.11
			SD	12.89
		Lo-Cred	$\bar{X}$	102.15
			SD	8.46
Discursive	Self-Drawn	Hi-Cred	$\bar{X}$	109.89
			SD	17.85
		Lo-Cred	$\bar{X}$	101.59
			SD	9.12
	Author-Drawn	Hi-Cred	$\bar{X}$	103.77
			SD	12.71
		Lo-Cred	$\bar{X}$	102.74
			SD	6.22

[a]These scores reflect a constant of 100 added to all absolute scores to eliminate, for computational purposes, all negative values.

To compute this measure each S's pretest score was subtracted from his posttest score to yield an attitude change measure with a possible range of from -100 to +100. A positive score indicates change in a directopm consistent with that advocated in this study.

Table 3 is the ANOVA summary table for this attitude change data.

Table 3

Graphic rating scale

ANOVA summary table:

Absolute attitude change scores

Source	df	SS	MS	F
Program (P)	1	373.41	373.41	1.66
Conclusion-Drawing (C)	1	1213.63	1213.63	5.41*
Source Credibility (S)	1	547.85	547.85	2.44
P x C	1	275.63	275.63	1.23
P x S	1	118.52	118.52	<1
C x S	1	75.85	75.85	<1
P x C x S	1	322.67	322.67	1.44
Error	208	46699.04	224.51	
Total	215	49626.59		

*$p < .05$

It can be noted that only one main effect, that of Conclusion-Drawing was significant ($F = 5.41$, $df = 1, 208$, $p < .05$), indicating that self-drawing of conclusions resulted in greater attitude change than when conclusions were drawn for the Ss. There were no significant interactions.

Semantic Differential Scale. Table 4 presents the means and standard deviations of the pre and posttest attitude ratings for each of the experimental cells as evaluated by the Semantic Differential Scale. On this scale also a score of 0 represents an attitudinal position maximally discrepant from that advocated in the study while a score of 126 represents an attitudinal position maximally congruent with that of the advocated message.

Table 4

Semantic Differential Scale

Pre- and posttest means and standard deviations

				Pre	Post
Syllogistic	Self-Drawn	Hi-Cred	$\bar{X}$	98.19	102.33
			SD	12.88	12.21
		Lo-Cred	$\bar{X}$	96.15	99.26
			SD	12.98	19.35
	Author-Drawn	Hi-Cred	$\bar{X}$	91.85	94.78
			SD	16.00	19.27
		Lo-Cred	$\bar{X}$	91.07	94.48
			SD	16.51	16.36
Discursive	Self-Drawn	Hi-Cred	$\bar{X}$	91.00	93.78
			SD	16.06	17.58
		Lo-Cred	$\bar{X}$	99.81	99.11
			SD	16.37	19.27
	Author-Drawn	Hi-Cred	$\bar{X}$	92.56	29.15
			SD	14.32	15.76
		Lo-Cred	$\bar{X}$	93.48	91.11
			SD	16.52	19.38

Table 5 presents the attitude change scores for these same cells. Computation of these measures was identical to that for the Graphic Rating Scale. The possible range of scores, however, varies from -126 to +126 with a negative score indicating the boomarange effect.

Table 5

Semantic Differential Scale

Means and standard deviations of the absolute attitude change scores for each of the eight treatment cells[a]

Syllogistic	Self-Drawn	Hi-Cred	X	104.15
			SD	13.41
		Lo-Cred	X	103.19
			SD	13.71
	Author-Drawn	Hi-Cred	X	102.43
			SD	9.36
		Lo-Cred	X	103.41
			SD	7.97
Discursive	Self-Drawn	Hi-Cred	X	102.78
			SD	7.78
		Lo-Cred	X	99.30
			SD	7.13
	Author-Drawn	Hi-Cred	X	97.60
			SD	7.60
		Lo-Cred	X	97.63
			SD	8.42

[a]These scores reflect a constant of 100 added to all change scores to eliminate, for computational purposes, all negative values.

Table 6 is the ANOVA summary table for this attitude change data. The main effect of Programs was significant at the .01 level (F = 7.08, df = 1, 208, $p < .01$), indicating that the syllogistic message was superior to the discursive in eliciting attitude change. No other effects, main or interactional, were evident.

Table 6

Semantic Differential Scale

ANOVA summary table

Absolute attitude change scores

Source	df	SS	MS	F
Program (P)	1	696.96	696.96	7.08**
Conclusion-Drawing (C)	1	115.57	115.57	1.17
Source Credibility (S)	1	118.52	118.52	1.20
P x C	1	50.07	50.07	<1
P x S	1	83.13	83.13	<1
C x S	1	29.63	29.63	<1
P x C x S	1	.02	.02	<1
Error	208	20486.96	98.50	
Total	215	21580.87		

**$p < .01$

While the findings of a Conclusion-Drawing main effect on the Graphic Rating Scale, and of a Program main effect on the Semantic Differential Scale are entirely consistent with the hypotheses of this study, a closer inspection of the data suggested a method of analysis which might provide a stronger test of the hypotheses. A tally of pretest scores on the Graphic Rating Scale indicated that treatment cells varied from 3 to 14 in the number of Ss who had pretest scores of 90 and above, thus leaving little or no room for any attitude change to emerge at all. On the Semantic Differential Scale the number of Ss with scores of 110 and above varied from 1 to 6. These pretest cell differences, it was reasoned, might have effectively interferred with the results by limiting (or increasing) the amount of attitude change that might have resulted had the scale ceiling been higher. Thus it was decided to reanalyze the data using as the dependent measure the percent of change obtained relative to the amount of change possible. In effect this measure "neutralizes" the effects of differing pretest cell arrays by simply considering the percent of possible change actually elicited.

Graphic Rating Scale. To compute these percent scores for the Graphic Rating Scale each S's pretest score was subtracted from 100 (the highest score attainable). This provided a measure of the total change possible for that S. Each pretest score was then subtracted from the posttest score for the same S to yield a measure of the total absolute change elicited. This second measure was then divided by the first to yield an index of the percent of actual change elicited relative

to the amount possible. Table 7 presents the means and standard deviations of these change indices. Table 8 is the ANOVA summary table for this data.

Table 7

Graphic Rating Scale

Means and standard deviations of the percent attitude change scores for each of the eight treatment cells[a]

Syllogistic	Self-Drawn	Hi-Cred	$\bar{X}$	1.39
			SD	.23
		Lo-Cred	$\bar{X}$	1.28
			SD	.42
	Author-Drawn	Hi-Cred	$\bar{X}$	1.18
			SD	.33
		Lo-Cred	$\bar{X}$	1.07
			SD	.23
Discursive	Self-Drawn	Hi-Cred	$\bar{X}$	1.24
			SD	.33
		Lo-Cred	$\bar{X}$	1.11
			SD	.28
	Author-Drawn	Hi-Cred	$\bar{X}$	1.23
			SD	.38
		Lo-Cred	$\bar{X}$	1.13
			SD	.25

[a]These scores reflect a constant of 1.00 added to all percent scores to eliminate, for computational purposes, all negative values.

Table 8

Graphic Rating Scale

ANOVA summary table:

Percent attitude change scores

Source	df	SS	MS	F
Program (P)	1	.1380	.1380	1.34
Conclusion-Drawing (C)	1	.6089	.6089	6.04*
Source Credibility (S)	1	.6825	.6825	6.77**
P x C	1	.6052	.6052	6.01*
P x S	1	.0006	.0006	<1
C x S	1	.0044	.0044	<1
P x C x S	1	.0044	.0044	<1
Error	208	20.9556	.1077	
Total	215	22.9997		

**$p < .01$

*$p < .05$

Reanalyzing the data in this manner, again using a 2 x 2 x 2 analysis of variance, there emerged two significant main effects, those of Conclusion-Drawing (F = 60.4, df = 1, 208, $p < .15$) and of Source Credibility (F = 6.78, df = 1, 208, $p < .01$). The first of these main effects indicates, again, that the self-drawing of conclusions led to greater attitude change than author-drawing. The second represents a superiority of a high credible source over a low credible source in eliciting attitude change. The Program x Conclusion-Drawing interaction was also significant (F = 6.01, df = 1, 208, $p < .05$). By Duncan Multiple Range Comparisons it was substantiated that the Syllogistic - Self-Drawn cell emerged as significantly higher ($p < .01$, df = 208) in the amount of attitude change elicited than any other cell. Although the Syllogistic - Author-Drawn cell was considerably lower than either of the Discursive Program cells, these three did not differ significantly from one another.

This interaction indicates that the syllogistic communication is greatly influenced by whether or not Ss are required to draw their own conclusions. Thus, when this opportunity is available the effectiveness of the syllogistic program was significantly greater than that of the Discursive Program, Self-Drawn or Author-Drawn. Yet when this opportunity was not available syllogistic superiority was greatly reduced. With a Discursive Program, however, the factor of conclusion-drawing had little effect. No other main effects or interactions were significant.

Semantic Differential Scale. The computation of the percent change

indices for the Semantic Differential Scale was identical to that for the Graphic Rating Scale, although the measure of total change possible was determined by subtracting each pretest score from 126 (the highest score attainable on this scale). Table 9 presents the means and standard deviations for these change indices. Table 10 is the ANOVA summary table for this data.

Table 9

Semantic Differential Scale:

Means and standard deviations of the

Percent attitude change scores

for each of the eight treatment cells[a]

Syllogistic	Self-Drawn	Hi-Cred	$\bar{X}$	1.17
			SD	.31
		Lo-Cred	$\bar{X}$	1.20
			SD	.34
	Author-Drawn	Hi-Cred	$\bar{X}$	1.14
			SD	.24
		Lo-Cred	$\bar{X}$	1.13
			SD	.19
Discursive	Self-Drawn	Hi-Cred	$\bar{X}$	1.12
			SD	.21
		Lo-Cred	$\bar{X}$	1.09
			SD	.26
	Author-Drawn	Hi-Cred	$\bar{X}$	1.05
			SD	.14
		Lo-Cred	$\bar{X}$	1.05
			SD	.18

[a]These scores reflect a constant of 1.00 added to all percent scores to eliminate, for computational purposes, all negative values.

Semantic Differential Scale:

ANOVA summary table:

Percent attitude change scores

Source	df	SS	MS	F
Programs (P)	1	.3769	.3769	6.21*
Conclusion-Drawing (C)	1	.1530	.1530	2.52
Source Credibility (S)	1	.0005	.0005	<1
P x C	1	.0022	.0022	<1
P x S	1	.0044	.0044	<1
C x S	1	.0008	.0008	<1
P x C x S	1	.0137	.0137	<1
Error	208	12.6282	.0607	
Total	215	13.1797		

*$p < .05$

Again, as with the original change measures, the Program main effect was significant ($F = 6.21$, $df = 1, 208$, $p < .05$) in the direction of syllogistic superiority over that of a Discursive message. No other main effects or interactions were significant.

Incidental Analyses. In addition the analyses of variance two further analyses were computed. The first of these was a chi-square analysis of the number of Ss in the Conclusion-Drawing groups (Self-Drawn) who actually arrived at the correct conclusion to the counter-attitudinal communication. Since the hypotheses of this study rest upon the theory that it is in the learning of the arguments leading up to the conclusions , and not the learning of the conclusions per se that differentiates the Syllogistic from the Discursive conditions there should theoretically be no difference between these groups in the learning of the conclusion itself. Data is available from this experiment to test this hypothesis within those treatment groups in which Ss were asked to write in their own conclusions. Results of this chi-square analysis indicate no significant differences in the number of Ss arriving at the correct conclusion between Syllogistic and Discursive conditions ($\chi^2 = .7623$, $df = 208$. ns).

Finally, Pearson Product Moment Correlations were computed between scores on the Graphic Rating Scale and the Semantic Differential Scale. On pretest scores this correlation was +.62 while on posttest scores the correlation was +.65. There is no significant difference between these two correlations. However, when the posttest correlations were broken down by treatment group the results indicated some interesting

trends which will be discussed later. Table 11 presents these correlations.

Table 11

Posttreatment Correlations between the Graphic Rating Scale and the Semantic Differential Scale for each of the eight treatment cells

	Self-Draw		Author-Draw	
	Hi-Cred	Lo-Cred	Hi-Cred	Lo-Cred
Syllog.	.25	.60	.67	.72
Discur.	,80	.79	.68	.60

Chapter IV

Discussion

Taken together, the results of this investigation provide reasonable support for several of the research hypotheses of this study while failing to support, or only tentatively supporting, two others.

Graphic Rating Scale. The basic working hypothesis of this study is that, owing to its provisions for more ideal learning conditions, the Syllogistic program will be superior to the Discursive program in eliciting attitude change. As measured by the Graphic Rating Scale this nypothesis was n o t supported. However, reanalyzing the data using the percent attitude change indices the predicted Program x Conclusion-Drawing interaction emerged significantly. The means for this interaction suggest that a syllogistic message is far superior to any other Program X Conclusion-drawing condition when Ss were asked to provide their own conclusions. The Syllogistic - Self-Drawn cell elicited greater than 30% more attitude change than any other cell. When the opportunity for conclusion-drawing is absent, however, this program elicited 10% less change than did the next less effective cell, indicating that the factor of conclusion-drawing is crucial to the effectiveness of a Syllogistic program. That it was not simply due to a greater incidence of correct-conclusion knowledge by the Ss in the Syllogistic conditions is supported by the Syllogistic versus Discursive chi-square analysis. Both Syllogistic and Discursive Ss did, in fac t, know the correct conclusion. It was in the acceptance of this conclusion owing to

a better learning of the supportive arguments that the Syllogistic program was more effective.

The great dependence of the Syllogistic program on reinforcement might explain the lack of a main Program effect since without reinforcement its effectiv eness is reduced over even that of a Discursive program. The 42% difference in the amount of attitude change between the Syllogistic - Self-Drawn and the Syllogistic - Author-Drawn cells, coupled with the great inferiority of the Syllogistic - Author-Drawn over the Discursive program, Self-Drawn or Author-Drawn, also seems to indicate that syllogistic superiority as a function of judicious stimuli arrangement is a relatively minor concern. It appears as though stimuli arrangement merely provides conditions within which the reinforcement factor may operate, such that alone it is ineffective. However, coupled with reinforcement, this cell provides for significantly greater attitude change than reinforcement alone, which in turn provides for greater change than does any non-reinforcement condition.

The second major hypothesis of this study is that conclusion-drawing by the Ss will result in greater attitude change than if the conclusions are immediately provided by the written communication (Author-Drawn). As measured by the Graphic Rating Scale this hypothesis is strongly supported using both the absolute change scores and the percent change scores. Although it cannot be stated with certainty that this finding reflects a superiority in learning owing to superior reinforcement contingencies, the finding of a significant Program x Conclusion-Drawing interaction does lend considerable support to this interpretation since

it is in the Syllogistic Program that the effects of reinforcement are the more cogently taken advantage of.

Source Credibility. A *t* test on the credibility ratings of the two fictitious sources used provides unqualified support for the contention that the credibility manipulation itself was successful ($t = 20.03$, $df = 214$, $p < .01$) indicating that the High Credibility Source was, indeed, perceived as more credible than was the Low Credible Source. Yet a surprising finding from this study is that the credibility manipulation did not succeed in altering attitude change using absolute change scores as the dependent measure. As this finding is widely discrepant from an enormous body of prior research stemming out of the Hovland, Janis and Kelley (1953) school it serves to increase confidence in the contention that there were possible abnormalities in the pretest data. This, in turn, serves to further justify the use of percent attitude change scores. Using these indices, moreover, the credibility effect emerges as highly significant. This result is interpreted as supporting the hypothesis that source credibility is an important factor in providing for message acceptance, and hence, attitude change.

The failure to find the hypothesized Source x Program interaction may reflect the fact that the Syllogistic program is effective only under conditions of program reinforcement (cf., the Program x Conclusion-Drawing interaction). Thus considering the Syllogistic program over both reinforcement conditions may have served to suppress any Program x Credibility interaction that may have emerged. The fact that the Program main effect was nonsignificant serves to lend a certain degree of

confidence to this explanation.

Semantic Differential Scale. As measured by the Semantic Differential Scale the only finding to emerge significantly was that of the Syllogistic versus Discursive program. The Syllogistic program here was significantly more effective in eliciting attitude change. It is here again especially surprising that source credibility was non-influencial, and this lack of significance obtained both under absolute and percent attitude change measures.

This lack of support for an obvious prediction, and its contradiction to the Hovland, et al (1953) research leads to some interesting speculation.

It is highly likely tha- the Semantic Differential Scale, having been designed specifically to measure affective change, is too narrow in scope, hence too insensitive, to many of the variables that might be relevant to attitude change. If this is so, then, only if Consistency Theory is correct would a change in any of these variables be expected to result in attitude change as measured by the Semantic Differential Scale. If, however, affective change does not automatically occur as a consequence of cognitive change (i.e., if the Consistency Theory formulation is too wide-sweeping), then the manipulation of those variables related to cognitive, i.e., belief acceptance, would not be expected to manifest themselves as affective-scale changes. If it can be assumed that source credibility is, in fact, relevant to belief-acceptance, and this seems a reasonable assumption, then the results of this study provide support for this reasoning. And thus, this study

might be interpreted as providing negative support for a Consistency hypothesis, since the manipulation of a more-properly cognitive factor succeeded in affecting the amount of attitude change as measured by a cognitive-oriented scale, and did not succeed in affecting ratings on the affect-specific scale.

In exploring this reasoning further it is suggested that if it is attitude change, and not attitude-component change that is being evaluated, then if Syllogistic superiority is, in fact, based upon more effective Program-learning then any scale designed to evaluate attitudes should provide a reasonable measure of attitude change, regardless of which "component" or combination of atittudinal "components" the scale is designed to measure. If, however, its superiority is due chiefly to some other factor, i.e., its more stark presentation of the program conclusion (a cognitive manipulation only in this case, and roughly analogous to Rosenberg and Abelson's (1960) affective manipulation via hypnosis), then a scale designed to measure affective change alone (i.e., the Semantic Differential Scale) would be relatively insensitive to the Program manipulation unless the Consistency Theory claim is valid (i.e., that there is some basic tendency or drive towards cognitive-affective consistency).

A Discursive communication, on the other hand, would be heavily reliant upon a broad measure of attitudes, and hence attitude change. This is because its reduced effectiveness would require a measurement scale sensitive to various attitudinal components in order for change to be measurable. A scale too selective in scope (i.e., the Semantic

Differential Scale) might easily reduce the possibility of change being detected. And, in fact, the results of this study support this post hoc reasoning also. Changing the emphasis from Syllogistic superiority to Discursive inferiority, then it may be that the Discursive Program was so ineffective as to result in no change on the highly selective Semantic Differential Scale. Thus, the Syllogistic Program emerged as significantly more effective. On the broader measurement scale, however, the Graphic Rating Scale was sensitive to more of those variables which might influence attitude change, and hence, more sensitive to changes as a result of the Discursive as well as the Syllogistic Program. The lack of significance on the GRS between these two Programs might reflect this increased sensitivity of the Graphic Rating Scale.

In attempting to support this reasoning with further empirical evidence correlation coefficients were obtained between the Graphic Rating Scale and the Semantic Differential Scale evaluations by each S. These results were presented in Table 11. On the basis of this study it can be assumed that reinforcement is a more influencial variable in attitude change than is source credibility. In fact, taking the study as a whole, source credibility is a somewhat negligible consideration. Thus, rank ordering the treatment groups for each Program condition on the basis of their ability to provide maximum attitude change to occur the following trends emerged. As conditions decrease for the effectiveness of the Syllogistic Program, the consistency increases between the more general attitudinal measuring device (the Graphic Rating Scale) and the more specific affective measuring scale. As conditions decrease

for Discursive effectiveness, on the other hand, this "cognitive-affective" consistency decreases. This finding may be interpreted as supporting the contention that a Syllogistic program is highly effective in inducing attitude change and, in fact, casts its influence on general attitude change (or perhaps cognitive change) as opposed to affective change alone. A Consistency prediction would have been that there should be no such correlational trends evident. Conversely, however, the greater the possibility for Discursive effectiveness the less becomes the consistency between the GRS and the SDS. While this is entirely consistent with Balance Theory the fact remains that the Discursive Program as a whole was less effective than was the Syllogistic Program, and thus, the support for Consistency Theory is somewhat mitigated. Another way of looking at this is that the better the conditions for attitude change to occur the less is the relevance that the Balance Principle holds. What may be happening is that traditional attitude change research failed to take advantage of maximum attitude change conditions (i.e., the use of Discursive rather than Syllogistic + Reinforcement Programs), and thus did not recognize the relationship between what looks like a consistency drive and a continuum of attitude change conditions ranging from "poor conditions for" to "good conditions for" attitude change. And the consistency drive, itself, may be nothing more than a reflection of confounded variable manipulation owing to the ambiguity over just what the Discursive communication actually does manipulate.

Although this study does not incorporate a direct test of this

reasoning it is felt that the supportive evidence is strong enough to warrant further research along these lines. The fact that the Syllogistic approach to attitude change has not been considered prior to this paper, and the interesting results of this study, certainly justify further research. However, there are certain difficulties in Reinforcement interpretation which require a more refined formulation before further research is undertaken.

Rosenberg (1960) presents persuasive evidence for a balance tendency. Having altered the affective component of an attitude through hypnosis it was observed that a certain cognitive reorganization did occur such that beliefs came to be consistent with the newly changed affect. This research provides perhaps the purest test of Consistency Theory if it can be assumed that the hypnotically-induced affective change was, in fact, just that. That these findings, then, are contradictory to those of the present study are, at this time, irreconcilable. Yet perhaps with further research on Syllogistic attitude change and a refinement of the procedure used such differences can be explained.

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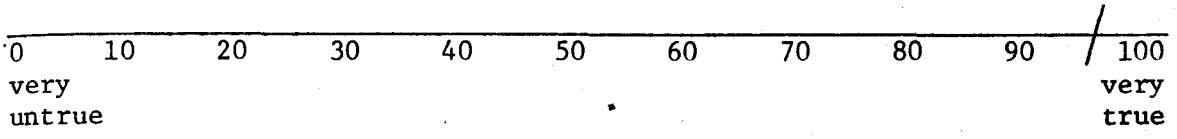
Appendix I

Graphic Rating Scale

Please indicate your own opinion of the truth of the following statement by drawing a line through the scale at the point where you feel the probability of its truth lies. For example, given the statement:

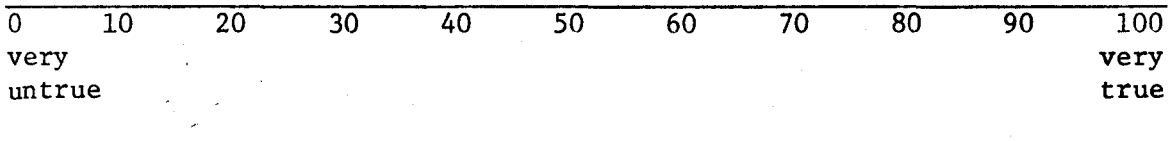
Poverty leads to hunger

you would draw a line through the scale at a place pretty similar to where it is drawn in this example: i.e.,



Now, do the following one yourself:

Statement: With regard to space research, the United States and Russia should pool all of their talents and resources.

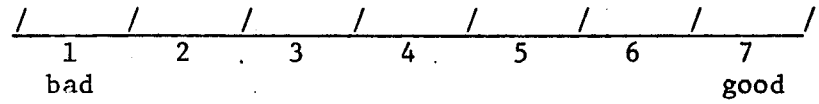


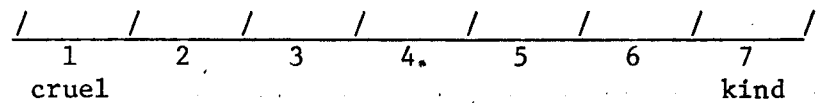
Appendix II

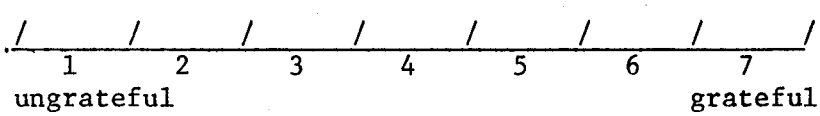
Abridged Semantic Differential Scale

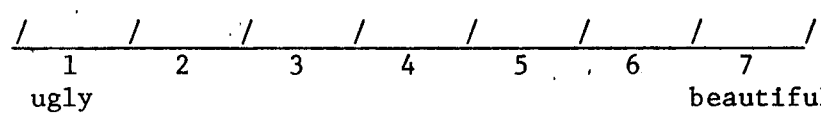
Please rate the following statement on each of the scales listed below. We realize that some of the scales might not seem appropriate to you, but do the best that you can in terms of your own opinions.

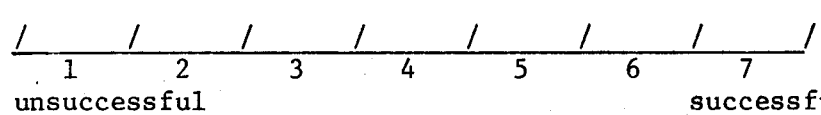
Statement: With regard to space research, the United States and Russia should pool all of their talents and resources.

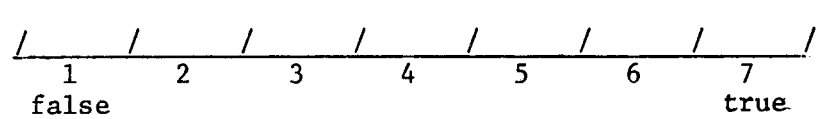


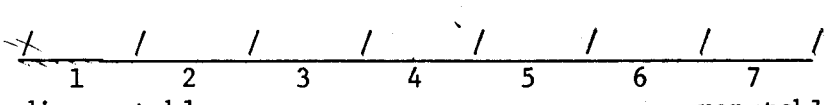


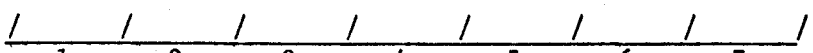


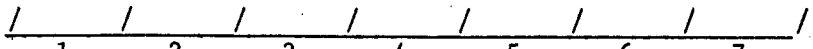


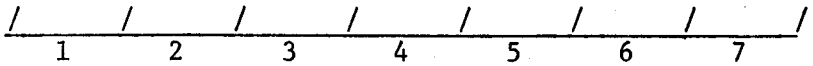







1 2 3 4 5 6 7
soft
hard


1 2 3 4 5 6 7
weak
strong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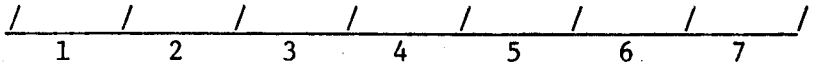
lenient
severe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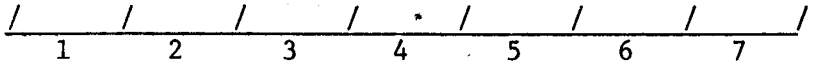
light
heavy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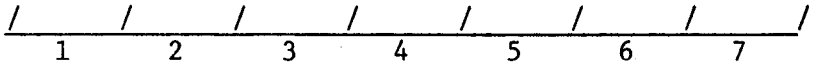
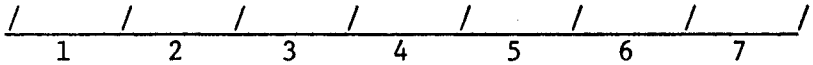
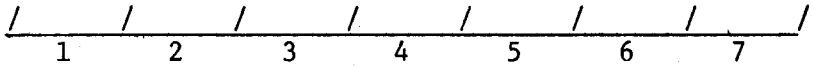
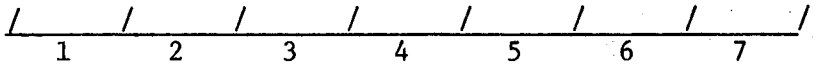
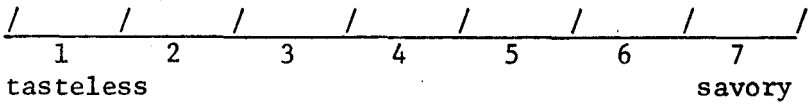
passive
active

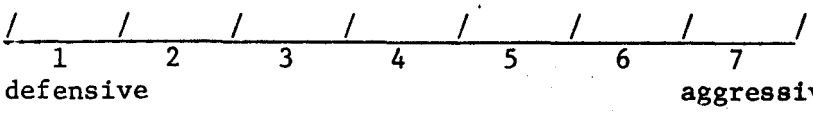

1 2 3 4 5 6 7
drunk
sober


1 2 3 4 5 6 7
insane
sane


1 2 3 4 5 6 7
rounded
angular


1 2 3 4 5 6 7
old
new


1 2 3 4 5 6 7
tasteless
savory


1 2 3 4 5 6 7
defensive
aggressive

Appendix III

High Credibility Source Biography

Dr. Harold R. Cullan, Ph.D., the author of the passage you are about to read, is current Chairman -Director of CISA, the Council on International Scientific Achievement. This council, now including 42 scientists from seven countries, was established in 1962 by a group of Soviet and American scientists committed to the potential of scientific inquiry in the area of space research within an atmosphere free of political pressures. The Council has since been recognized as the official policy-recommending organ of those countries involved.

Before assuming the Directorate of CISA by elective vote in 1965, Dr. Cullan served as Chief Staff Consultant to the International Association for Aerospace Research during which time he was decorated for his " . . . outstanding contribution to aeronautical safety engineering through applied research."

Dr. Cullan received his Ph.D. from MIT, summa cum laude, in 1953, and accepted a research post at the Institute for Aeronautical Engineering where he conducted most of his research prior to his involvement in international research policy. The passage you are about to read is the basic syllogistic core of [for discursive conditions, "an exerpt from"] the report submitted by Dr. Cullan in 1967 to the various aerospace agencies of the participating CISA countries.

Appendix IV

Low Credibility Source Biography

Harold R. Cullan, the author of the passage you are about to read, is currently enrolled in a Chicago "parental" high school for operating what was later exposed as a "fixed" sports lottery. It was estimated that he had earned over $700.00 from this racket before it was exposed.

The passage you are about to read is the basic syllogistic core of [for discursive conditions, "an exerpt from"] a speech delivered as an assignment for his Speech course. His assignment was to try and convince the audience of any point of view he selected. Each "team" was given one day in which to prepare his arguments, and he would be graded solely on the basis of how convincing his arguments were.

Appendix V

Credibility Manipulation Check

Place a check mark ( ) in one of the spaces on each of the two scales below.

1. How competent or expert do you feel the author is in preparing a message directly related to the ideal operating relationship between U.S. and Soviet space scientists?

/ / / / / / / / / / / /
0 1 2 3 4 5 6 7 8 9 10
none expert

2. How honest or truthful do you feel this author is in delivering this message which is directly related to the operating relationship between U.S. and Soviet space scientists?

/ / / / / / / / / / / /
0 1 2 3 4 5 6 7 8 9 10
none complete

Appendix VI

Syllogistic Program:
Self-Draw Condition

On the following pages you will read the message given by H. R. Cullan. For the sake of clarity his statements are arranged in the form of syllogisms. Each page will contain the two syllogistic premises. Your task is to read these premises and to write in the conclusion which follows from those premises. When you have finished reading and concluding all of the syllogisms you will have read his message. All of the syllogisms you will read and conclude follow the format:

Premise 1: A leads to B
Premise 2: B leads to C
Conclusion: A leads to C

Thus, for example, given the premises:

Poverty leads to hunger:
Hunger leads to illness: the conclusion which follows from these is
Poverty leads to illness.

Please write in the conclusion to each of the syllogisms on the following pages. After you have written in your conclusion, turn the page to read the correct conclusion.

The highest purpose in life for man is the full realization of his human potential

The full realization of his human potential lies in man's understanding of his role in the Universe.

Therefore:_____
_____.

Therefore: the highest purpose in life for man lies in his understanding of his role in the Universe.

The full realization of his human potential lies in man's understanding of his role in the Universe.

Man's understanding of his role in the Universe is, to a large extent, dependent upon methods of scientific investigation.

Therefore:_____

_____.

Therefore: the full realization of man's human potential is, to a large extent, dependent upon methods of scientific investigation.

Man's understanding of his role in the Universe is, to a large extent, dependent upon methods of scientific investigation.

Methods of scientific investigation are most fundamentally strategies in problem-solving.

Therefore: _____
_____.

Therefore: man's understanding of his role in the Universe relies most fundamentally on strategies in problem-solving.

Methods of scientific investigation are most fundamentally strategies in problem-solving.

Strategies in problem-solving require the maximization of cooperation if they are to be maximally efficient.

Therefore:_____
_____.

Therefore: methods of scientific investigation require the maximization of cooperation if they are to be maximally efficient.

Strategies in problem-solving require the maximization of cooperation if they are to be maximally efficient.

The maximization of cooperation requires the unselfish pooling of all available talents and resources.

Therefore: _____

Therefore: strategies in problem-solving require the unselfish pooling of all available talents and resources.

The interests of national security require a spirit of benevolence between nations.

A spirit of benevolence between nations can only come about if there is an understanding between nations.

Therefore: _____
_____.

Therefore: the interests of national security require that there be an understanding between nations.

The spirit of benevolence between nations can only come about if there is an understanding between nations.

An understanding between nations is best served through mutual interaction.

Therefore: _____
_____.

Therefore: the spirit of benevolence between nations is best served through mutual interaction.

An understanding between nations is best served through mutual interaction.

Mutual interaction is maximized through cooperative endeavors with common goals,

Therefore:_____
_____.

Mutual interaction is maximized through cooperative endeavors with common goals.

Cooperative endeavors with common goals are successful only to the extent that there is a pooling of available resources and talents.

Therefore:_____
_ _____.

The final conclusion to the entire line of argument, then, is that:

With regard to space research, those countries involved in such research should _____
_____.

The final conclusion to the entire line of argument, then, is that:

With regard to space research, those countries involved in such research should pool all of their talents and resources in order to achieve international scientific goals.

Appendix VII

Syllogistic Program:
Author-Draw Condition

On the following pages you will read the message given by H. R. Cullan. For the sake of clarity his statements are arranged in the form of syllogisms. Each page will contain the two premises and the conclusion which follows from those premises, such that when you have finished reading all of the syllogisms you will have read his message. All of the syllogisms you will read follow the format:

Premise 1: A leads to B
Premise 2: B leads to C
Conclusion: A leads to C

Thus, for example, given the premises:

Poverty leads to hunger:
Hunger leads to illness: the conclusion which follows from these is
Poverty leads to illness.

The highest purpose in life for man is the full realization of his human potential.

The full realization of his human potential lies in man's understanding of his role in the Universe.

Therefore: the highest purpose in life for man lies in his understanding of his role in the Universe.

The full realization of his human potential lies in man's understanding of his role in the Universe.

Man's understanding of his role in the Universe is, to a large extent, dependent upon methods of scientific investigation.

Therefore: the full realization of man's human potential is, to a large extent, dependent upon methods of scientific investigation.

Man's understanding of his role in the Universe is, to a large extent, dependent upon methods of scientific investigation.

Methods of scientific investigation are most fundamentally strategies in problem-solving.

Therefore: man's understanding of his role in the Universe relies most fundamentally on strategies in problem-solving.

Methods of scientific investigation are most fundamentally strategies in problem-solving.

Strategies in problem-solving require the maximization of cooperation if they are to be maximally efficient.

Therefore: methods of scientific investigation require the maximization of cooperation if they are to be maximally efficient.

Strategies in problem-solving require the maximization of cooperation if they are to be maximally efficient.

The maximization of cooperation requires the unselfish pooling of all available talents and resources.

Therefore: strategies in problem-solving require the unselfish pooling of all available talents and resources.

The interests of national security require a spirit of benevolence between nations.

The spirit of benevolence between nations can only come about if there is an understanding between nations.

Therefore: the interests of national security require that there be an understanding between nations.

The spirit of benevolence between nations can only come about if there is an understanding between nations.

An understanding between nations is best served through mutual interaction.

Therefore: the spirit of benevolence between nations is best served through mutual interaction.

An understanding between nations is best served through mutual interaction.

Mutual interaction is maximized through cooperative endeavors with common goals.

Therefore: an understanding between nations is maximized through cooperative endeavors with common goals.

Mutual interaction is mzximized through cooperative endeavors with common goals.

Cooperative endeavors with common goals are successful only to the extent that there is a pooling of available resources and talents.

Therefore: mutual interaction is successful only to the extent that there is a pooling of available resources and talents.

With regard to space research, then, those countries involved in such research should pool all of their talents and resources in order to achieve international scientific goals.

Appendix VIII

Discursive Program:
Self-Draw Condition

On the following page you will read the message given by H. R. Cullan. For the sake of clarity his message has been condensed although the essential points have not been changed. Please read the message carefuoly. When you have finished you will be asked to summarize the message and indicate the specific position taken by the author.

Appendix VIII

Discursive Program:
Self-Draw Condition

Since the highest purpose in man's life is the full realization of his human potential it would follow that only to the extent that he realizes this potential can he achieve his ultimate purpose. Yet man requires an understanding of his role in the Universe for this to obtain, an understanding based on methods of scientific investigation using the best strategies available for this problem-solving process. It is largely through methods of scientific investigation based on such problem-solving strategies that man will be able to understand his unique role in the Universe.

Now it has been shown in numerous scientific investigations that mutual cooperative interaction is the most efficient strategy for problem-solving tasks, and hence, for methods of scientific investigation. And maximally cooperative problem-solving strategies require a sharing not only of knowledge and abilities, but also of those talents and resources which are necessary for scientific investigation.

As further evidence for this need for the maximization of cooperative interaction in the problem-solving process of scientific investigation, it should be realized that maximum cooperative interaction will, because by definition it requires interpersonal interaction, endenger a spirit of benevolence between the cooperating nations. This is because such interaction towards a common goal lends itself to an increased mutual understanding and thus to benevolence. And certainly it is unquestionable that a spirit of benevolence between nations would have the advantage of contributing to the interests of national security. Through cooperative sharing of resources and talents, then, the nations involved can come to a better understanding of one another, an understanding of common goals, of ways of life, of feelings and attitudes, etc., all of which serve not only to increase man's understanding of his role in the Universe and of one another, but also which ease international conflicts, thus furthering the interests of national security. I would maintain, in fact, that a spirit of benevolence and an increased mutual understanding as a function of cooperation in the pooling of resources and talents is one of the best ways of insuring a realization of human potential and human understanding since such realization permits problem-solving strategies unencumbered by selfish interests.

On this page write a brief summary of the arguments you have just read and specify exactly what the ultimate conclusion to the entire message is, according to its author.

Summary:

Specific Conclusion:

Appendix IX

Discursive Program:
Author-Draw Condition

On the following page you will read the message given by H. R. Cullan. For the sake of clarity his message has been condensed although the essential points have not been changed. Please read the message carefully. When you have finished you will be asked some questions related to it.

Appendix IX

Discursive Program:
Author-Draw Condition

Since the highest purpose in man's life is the full realization of his human potential it would follow that only to the extent that he realizes this potential can he achieve his ultimate purpose. Yet man requires an understanding of his role in the Universe for this to obtain, an understanding based on methods of scientific investigation using the best strategies available for this problem-solving process. It is largely through methods of scientific investigation based on such problem-solving strategies that man will be able to understand his unique role in the Universe.

Now it has been shown in numerous scientific investigations that mutual cooperative interaction is the most efficient strategy for problem-solving tasks, and hence, for methods of scientific investigation. And maximally cooperative problem-solving strategies require a sharing not only of knowledge and abilities, but also of those talents and resources which are necessary for scientific investigation.

As further evidence for this need for the maximization of cooperative interaction in the problem-solving process of scientific investigation, it should be realized that maximum cooperative interaction will, because by definition it requires interpersonal interaction, engender a spirit of benevolence between the cooperating nations. This is because such interaction towards a common goal lends itself to an increased mutual understanding and thus to benevolence. And certainly it is unquestionable that a spirit of benevolence between nations would have the advantage of contributing to the interests of national security. Through cooperative sharing of resources and talents, then, the nations involved can come to a better understanding of one another, an understanding of common goals, of ways of life, of feelings and attitudes, etc., all of which serve not only to increase man's understanding of his role in the Universe and of one another, but also which ease international conflicts, thus furthering the interests of national security. I would maintain, in fact, that a spirit of benevolence and an increased mutual understanding as a function of cooperation in the pooling of resources and talents is one of the best ways of insuring a realization of human potential and human understanding since such realization permits problem-solving strategies unencumbered by selfish interests.

In conclusion, then, I strongly recommend that our nations can maximize their understanding of their roles in the Universe through a maximally cooperative interaction involving the pooling of all talents and resources. Such cooperative pooling of resources and talents would certainly bring us closer to those scientific goals common to all nations sharing man's attempt at understanding his role in the Universe.

APPROVAL SHEET

The dissertation submitted by James M. Torcivia has been read and approved by members of the Department of Psychology.

The final copies have been examined by the director of the dissertation and the signature which appears below verifies the fact that any necessary changes have been incorporated and that the dissertation is now given final approval with reference to content and form.

The dissertation is therefore accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

August 22, 1968
Date

Lemuel H Johnson
Signature of Adviser